AMSAT News Service Weekly Bulletins
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AMSAT NEWS SERVICE
ANS-113

ANS is a free, weekly, news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

Please send any amateur satellite news or reports to:
ans-editor@amsat.org

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* Volunteers are needed to help at the AMSAT booth at Dayton. Gould *
* WA4SXM, is looking for volunteers to help man the AMSAT booth dur- *
* ing the 2012 Hamvention. People are needed all 3 days for 2 hour *
* shifts. Please send the days and times you are available to help *
* as well as how many shifts you are willing to work via e-mail to *
* wa4sxm at amsat.org. *
* Monitor http://www.amsat.org/amsat-new/hamvention/2012/Dayton.php *
* for the latest AMSAT at Dayton news and developments *
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SB SAT @ AMSAT $ANS-113.01
ANS-113 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 113.01
>From AMSAT HQ SILVER SPRING, MD.
April 22, 2012
To All RADIO AMATEURS
BID: $ANS-113.01

Schedule of AMSAT Activities at Dayton Hamvention

Here are the daily AMSAT activities at the 2012 Hamvention!

Thursday 17 May 2012

+ 10:00 AM - 5:00 PM
  AMSAT Booth Setup at Ball Arena (contact Gould Smith, WA4SXM,

wa4sxm@amsat.org if you can help during this time).

+ 6:30 PM - 10:00 PM
The third Annual AMSAT "Dinner at Tickets" party will be held at Tickets Pub & Eatery in Fairborn, OH. Food can be ordered from the menu and drinks (beer, wine, sodas and iced tea) are available at the bar. Directions and coordinates are on the AMSAT Web site. Bring some friends and have a great time the night before Hamvention. Tasty selection of Greek and American food and great company!

Demos Daily on Friday, Saturday, and Sunday for All Available Passes
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AMSAT is encouraging all students attending the 2012 Dayton Hamvention to come by the Satellite Demonstration Area just outside of the Ball Area entrance and make a contact using the amateur satellites. There will be AMSAT volunteers there to explain how to make the contacts and during actual satellite passes will try to get as many students as possible to complete actual contacts. There are lists of satellite pass times in the satellite demonstration area and at the AMSAT booth.

Friday 18 May 2012

+ 9:00 AM - 6:00 PM at the AMSAT Booth
AMSAT Booth open for membership renewals, books, new items and information. Outdoor satellite demonstrations right outide the Ball Arena entrance. Engineering area with Fox and ARISSat-1 satellite prototype displays.

+ 4:00 PM at the ARRL Stage
AMSAT and ARRL are teaming up during the 2012 Hamvention to recruit new ARISS (Amateur Radio on the International Space Station) Technical Mentors and Ground Station Operators.
Friday and Saturday (May 18 & 19) at 4pm in the ARRL stage area AMSAT Vice President for Educational Relations Mark Hammond N8MH will explain the need for additional ARISS Technical Mentors and Ground Station Operators and the requirements and responsibilities needed to help provide a reliable conversation between astronauts and selected schools or groups.

+ 6:30 PM - 10:30 PM AMSAT/TAPR Banquet at Dayton 2012
AMSAT/TAPR Banquet on Friday night, May 18 is one of the main AMSAT activities during the 2012 Hamvention at Dayton.

AMSAT is pleased to announce that Howard Long, G6LVB will be the featured speaker for the evening event. Howard will be talking about his FUNcube Dongle, the 64 - 1700 MHz Software Defined Receiver.

Banquet tickets will not be sold at the AMSAT booth during the Hamvention so reservations must be made through the AMSAT Store:
http://www.amsat-na.com/store/item.php?id=100158
Tickets are $30 apiece.

Saturday 19 May 2012

+ 9:00 AM - 6:00 PM at the AMSAT Booth
AMSAT Booth open for membership renewals, books, new items and information. Outdoor satellite demonstrations right outide the Ball Arena entrance. Engineering area with Fox and ARISSat-1 satellite prototype displays.

+ 11:15 AM - 1:30 PM The AMSAT Forum

  Get the latest information about what is going on with AMSAT and
  its projects. The AMSAT Forum will be held in Forum Room 5.

+ 4:00 PM at the ARRL Stage
  AMSAT Vice President for Educational Relations Mark Hammond N8MH
  will explain the need for additional ARISS Technical Mentors and
  Ground Station Operators and the requirements and responsibilities
  needed to help provide a reliable conversation between astronauts
  and selected schools or groups.

Sunday 20 May 2012

+ 9:00 AM - 1:00PM at the AMSAT Booth
  AMSAT Booth open for membership renewals, books, new items and
  information. Outdoor satellite demonstrations right outide the
  Ball Arena entrance. Engineering area with Fox and ARISSat-1
  satellite prototype displays.

+ 1:00PM - 5:00PM at the AMSAT Booth
  Take down and storage of the AMSAT Booth. (contact Gould Smith,
  WA4SXM, wa4sxm@amsat.org if you can help during this time).

[ANS thanks Gould Smith, WA4SXM for the above information]

May 15 Deadline to Apply for ARRL TI-2 Space in the Classroom Institute

The ARRL Education & Technology Program (ETP) is offering an advanc-
ed Teachers Institute (TI-2) session that focuses on space in the
classroom. This four-day professional development workshop is spon-
sored by the Dayton Amateur Radio Association and is held in their
location in Dayton, Ohio (July 9-12).

The TI-2 Space curriculum focuses on the nuts and bolts of setting
up and operating a satellite ground station. This serves as excellent
preparation for a scheduled contact with the ISS through the Amateur
Radio on the International Space Station (ARISS) program. But it also
provides instruction for continued use of satellites and other man
made space assets to explore naturally generated signals, space and
a variety of topics.

Thanks to generous assistance from Yaesu USA and Ham Radio Outlet,
participants will receive a full ground station that is configured
for satellite communications, as well as training on how to set it
up and use it to make Amateur Radio contacts and download telemetry
data.

To be considered for a seat in TI-2 Space, participants must possess
at least a Technician class license at the time off application. ARRL
membership is required. Priority for attending the TI-2 Space session
 will be given to teachers who have developed an educational proposal
accepted for participation in the ARISS Program.

This session has a class limit of 8 participants, so apply early! The
deadline for the TI-2 Space in the Classroom sessions of the Teachers
Institute is May 15.

Full details are posted on the ARRL web at:
http://www.arrl.org/ti-2-space-in-the-classroom

[ANS thanks the ARRL for the above information]

Five CubeSats in Preparation for July Launch to ISS

Five CubeSat teams continue work on preparations for a launch to the International Space Station in the July 18-21, 2012 time frame. These CubeSats will be launched from Tanegashima, Japan aboard the JAXA HTV-3 ISS resupply mission. The CubeSats will be loaded into the J-SSOD deployer on the Japanese Experiment Module, also known as Kibo. They will be deployed with the Kibo robotic arm planned for September, 2012 timeframe.

The five CubeSats include:
+ Raiko
+ We Wish
+ FITSat 1
+ F-1 Vietnam Student CubeSat
+ TechEdSat

RAIKO - Wakayama University, Japan
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http://www.astro.mech.tohoku.ac.jp/RAIKO/ (Japanese)

This 2U CubeSat includes experiments for:
+ Earth photography with a fish-eye lens camera
+ Photo tracking during deployment from ISS to measure relative motion.
+ Experimental star sensor
+ Membrane deployment experiment for de-orbit
+ High speed data communication experiment by Ku-band communication equipment:
  - o Orbit determination experiment by Doppler frequency measurement of Ku-band beacon.
  - o Mobile ground station and global cooperation for reception

FITSAT-1 - Fukuoka Institute of Technology, Japan
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http://www.fit.ac.jp/~tanaka/fitsat.shtml

The main mission of this 1U CubeSat will be a demonstration of high speed data transfer from a satellite. A second experiment aboard the satellite involves an attempt at visual tracking from the ground of the high-output LED flash to investigate the possibility of optical communication with satellites. The light from this flash will be received by the ground station equipped with a telescope with photo-multiplier linked to a parabolic antenna tracking the 5.8GHz downlink.

Frequencies announced for FITSAT-1:
CW Beacon 437.250 MHz,
FM Data 437.445 MHz,
High speed data 5840.00 MHz.

WE WISH - Meisei Electric Co., Ltd., Japan
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http://www.meisei.co.jp/news/2011/0617_622.html

The WE WISH mission plans to investigate the monitoring the global environment from space with the use of an upper atmosphere measurement experiment. This includes GPS technology, and technical proof of concept of a micro infra-red camera. The team has the additional goal of contributing to local technical education through the use of

CubeSat ground data acquisition.

F-1 Vietnam Student CubeSat

Vietnamese students in Hanoi plan to orbit the country's first satellite, their amateur radio CubeSat F-1 with the callsign XV1VN. The satellite will carry a low resolution C328 camera and two Yaesu VX-3R transceivers using 145.980 and 437.485 MHz.

+ VX-3R1, 437.485 MHz FM downlink:
  o Solar cell power only, operates in sunlight only
  o Output power: max 0.3W, half-wave dipole antenna
  o Morse code beacon (10 chars) using PWM CW every 30 seconds

+ VX-3R2, 145.980 MHz FM downlink:
  o Rechargeable battery, operates in dark and sunlight
  o Output power: max 1.0W, half-wave dipole antenna
  o AFSK 1200bps, half duplex, one AX.25 packet every 30 seconds

If the The F-1 web page at: http://fspace.edu.vn is not available the latest news and photos have been posted on the AMSAT-UK web: http://www.uk.amsat.org/5025

TechEdSat - San Jose State University
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http://ncasst.org/techedsat.html
http://www.uk.amsat.org/5018

TechEdSat is a 1U CubeSat built by San Jose State University in partnership with NASA Ames Research Center and AAC Microtec. It's mission is to evaluate Space Plug-and-play Avionics (SPA) designed in Sweden by AAC Microtec, and to perform a communications experiment utilizing the Iridium and Orbcomm satellite phone network.

Student hands-on learning opportunities were presented during the International Space Apps Challenge on April 21-22. For this challenge, space hackers implemented a fault-tolerant command and control system, utilizing both the OrbComm and Iridium modems as uplink and downlink. Ground segment of the software includes the ability for a laptop, Apple or Android phone to issue commands to the spacecraft over Iridium/Orbcomm. The students will also be challenged with designing the capability for relaying data received from the spacecraft automatically to Twitter.

TechEdSat has received IARU frequency coordination for its downlink on 437.465 MHz.

[ANS thanks the CubeSat teams, AMSAT-UK, and Mineo Wakita JE9PEL for the above information]

Naval Postgraduate School Develops Multi-CubeSat Deployment System

The Space Systems Academic Group (SSAG) at the US Naval Postgraduate School has developed the NPS CubeSat Launcher or NPSCuL (pronounced NPS-cool). This is an auxiliary payload platform to allow multiple CubeSats to be launched aboard rockets as secondary payload meaning the rocket would be able to carry satellites in onboard space that would otherwise be unused.

NPSCuL can accommodate up to 24 CubeSats in a single ESPA-class [Secondary Payload Adapter] payload volume. Upon reaching the desired

orbit spring-loaded doors will release the satellites one-by-one.

First flight is planned for August 2012 which will carry 11 CubeSats for the Operationally Unique Technologies Satellite (OUTSat). This will enable NPS researchers to get one of their own CubeSats into space. The NPS STARE CubeSat is part of a collaborative effort between NPS and the Lawrence Livermore National Laboratory (LLNL) on a proof-of-concept mission to observe other satellites and help determine threats posed by space debris.

The NPS has published a press release available on-line at:
http://tinyurl.com/CubeSat-NPSCuL (www.nps.edu).

The AMSAT-UK web also provided coverage of this story at:
http://www.uk.amsat.org/6375

[ANS thanks the US Naval Postgraduate School for the above information]

Successful ARISS School Contacts with California, Ecuador, and Japan

Academia Cotopaxi in Quito, Ecuador

On Friday, April 13, an ARISS) contact was held between students from Academia Cotopaxi in Quito, Ecuador and on-orbit astronaut Don Pettit, KD5MDT via station IK1SLD in Italy. Cotopaxi, an international American school with students in grades pre-K to 12, has a strong relationship with Ecuador's astronaut, Ronnie Nader, and the Ecuadorian Civilian Space Agency (EXA). It utilized several NASA resources in its curriculum covering space, technology and radio. Approximately 500 students and visitors were present for the event.

Saitama Scout Council Japan

Scouts from the Troop 2nd & 3rd Iruma Group, Saitama Scout Council, Scout Association of Japan participated in an ARISS contact on Saturday, April 14. An audience of 70 people, including one magazine representative, turned out for the contact and listened as the Scouts had their questions about living on the ISS answered by on-orbit astronaut Dan Burbank, KC5ZSX. The Scouts have their own radio club, JQ1YWJ and many of the Scouts have been attending amateur radio classes to become licensed.

Flabob Airport Preparatory Academy California

The Flabob Airport Preparatory Academy in Riverside, California had a successful ARISS contact on Thursday, April 19. The telebridge station IK1SLD in Italy provided the radio connection with the ISS. The ARISS contact complemented a comprehensive education plan to pique students' interest in Science, Technology, Engineering and Math (STEM).

After the event, ARISS mentor Clint Bradford, K6LCS declared, "SUCCESS at Flabob Airport this morning! Flight engineer Pettit answered all seventeen of our questions - from fifteen students." There were 211 in the audience, including 120 Flabob students, media, city council members, Gordon West and Don Arnold, and other dignitaries, AND a lot of parents, too!

Media coverage of the Flabob ARISS contact included California's sixth largest daily newspaper, The Press-Enterprise, sent a reporter, video-

grapher, and photographer, the Bob Heil & Gordon West mediacast, Ham Nation, sent a videographer - and the contact will be on an episode of their webcast in the next couple of weeks. Newspaper coverage included the editor and publisher of The Riverside County Record. Clint was interviewed on PBS radio affiliate KVCR. The Inland Empire Television Network videotaped the entire event.

The Press-Enterprise is the region's major newspaper. Links to their video, article, and photographs are posted on ISS-Flabob site blog at: http://www.iss-flabob.com/ISS-Flabob/Blog/Blog.html

Clint invites you to check out http://www.iss-flabob.com since this site created for the ARISS event also offers links and publications on amateur radio, our space programs, ARISS, AMSAT, ARRL, ham radio licensing - and MORE - on the MORE INFO page.

[ANS thanks Carol Jackson, KB3LKI and the Amateur Radio on the International Space Station (ARISS) Status Report for April 16, 2012 and Clint Bradford, K6LCS for the above information]

Two Months to Field Day - AMSAT FD Rules Posted

AMSAT Director Contests and Awards, Bruce Paige, KK5DO reminds you that time of year is once again approaching - Field Day!

Each year the American Radio Relay League (ARRL) sponsors Field Day as an emergency preparedness exercise. The event takes place during a 24-hour period on the fourth weekend of June. For 2012 the event takes place during a 27-hour period between 1800 UTC on Saturday, June 23, 2012 and 2100 UTC on Sunday June 24, 2012. Those who set up prior to 1800 UTC on June 23 can operate only 24 hours.

The Radio Amateur Satellite Corporation (AMSAT) promotes its own version of Field Day for operation via the amateur satellites, held concurrently with the ARRL event.

With the loss of AO-51 and SO-67 field day this year is going to be most challenging. If you are considering ONLY the FM voice satellites like AMRAD-OSCAR-27 or SaudiSat-Oscar-50 for your primary AMSAT Field Day focus: Don't, unless you are simply hoping to make one contact for the ARRL rules bonus points.

The congestion on FM LEO satellites was so intense in prior years that we must continue to limit their use to one-QSO-per-FM-satellite. This includes the International Space Station. You will be allowed one QSO if the ISS is operating Voice. You will also be allowed one digital QSO with the ISS or any other digital, non-store-and-forward, packet satellite (if operational).

If you have worked the satellites on Field Day in recent years, you may have noticed a lot of good contacts can be made on some of the less-populated, low-earth-orbit satellites like VUSat OSCAR-52,Fuji-OSCAR 29 (may or may not be operational), AMSAT-OSCAR 7. During Field Day the transponders come alive like 20 meters on a weekend. The good news is that the transponders on these satellites will support multiple simultaneous contacts. The bad news is that you can't use FM, just low duty cycle modes like SSB and CW.

The AMSAT Field Day 2012 event is open to all Amateur Radio operators. Amateurs are to use the exchange as specified in ARRL rules for Field

Day. The AMSAT competition is to encourage the use of all amateur satellites, both analog and digital.

For the complete listing of the AMSAT Field Day Rules please refer to the documents posted on-line at:
http://www.amsatnet.com/fd2012.doc
http://www.amsatnet.com/fd2012.pdf
Links are also accessible from http://www.amsat.org front page.

[ANS thanks AMSAT Director Contests and Awards, Bruce Paige, KK5DO for the above information]

FAA CARSR Radar May Impose Amateur Operating Restrictions on 23cm

An ARRL bulletin this week noted that the Federal Aviation Administration (FAA) is deploying a new generation of Common Air Route Surveillance Radar (CARSR) that has some implications for the use of the 1240-1300 MHz (23 cm) band by amateurs.

The Amateur Service allocation in this band is on a secondary basis, with aeronautical radionavigation and several other services primary in the United States Table of Frequency Allocations. The FCC rules require that amateur stations operating in the 23 cm band may not cause harmful interference to stations in the radionavigation-satellite service, the aeronautical radionavigation service, the Earth exploration-satellite service or the space research service.

One case of harmful interference in Southern California has been reported. CARSRs are being installed in several dozen locations throughout the country and will use various frequencies in the 1240-1350 MHz range with an occupied bandwidth of about 3 MHz. In the vicinity of the radars, amateur operation may be precluded in a portion of the 23 cm band. The ARRL is in contact with FAA engineers. The ARRL said they anticipate that the constraints on amateur use of the band will be limited to those necessary to protect aviation safety, which of course cannot be compromised.

The bulletin is posted on the ARRL web at:
http://www.arrl.org/news/amateurs-must-protect-new-radars-in-23-cm-band

[ANS thanks the ARRL for the above information]

AMSAT-UK on Satellites for World Amateur Radio Day

Members of AMSAT-UK operated on the amateur radio satellites from the RSGB National Radio Centre at Bletchley Park to celebrate World Amateur Radio Day (WARD) on Wednesday, April 18, 2012.

World Amateur Radio Day commemorates the founding of the International Amateur Radio Union (IARU) on April 18, 1925. This year's theme was "Amateur Radio Satellites: Celebrating 50 Years in Space" in remembrance of the launching of OSCAR 1 on December 12, 1961 and the launch of OSCAR 2 on June 2, 1962.

Those taking part in the event were Jim G3WGM, Dave G4DPZ, Trevor M5AKA, Ciaran M0XTD, Matthew SWL, Clive G3CWV, Carlos G0AKI and Elaine

G4LFM. The satellites worked during the day included FO-29 and AO-7 and contacts were made with stations across Europe using the 144 and 430 MHz bands.

The equipment used comprised a Kenwood TS-2000 with WiMo X quads for 144 and 430 MHz, with pre amps and polarisation switches.

Read the rest of this article, along with links to photos and video on-line on the AMSAT-UK web: http://www.uk.amsat.org/6516

[ANS thanks AMSAT-UK for the above information]

UK Will Restrict Use of Amateur Satellite Frequencies During Olympics

Trevor, M5AKA has filed the following notice on the AMSAT-UK web. The Olympic and Paralympic Games will be using almost half of the 430 MHz amateur radio allocation as well as segments of 2.3 GHz and 3.4 GHz during the period June 28 to September 23.

The impact on the Amateur-satellite Service 435-438 MHz allocation has been restricted to 436.25-437.25 MHz. It is understood that the equipment being used in the 430 MHz band will include handheld FM rigs at the hotels, the routes to the venues and the venues themselves.

The UK communications regulator Ofcom has provided details of the areas that need to be protected from RF within the designated frequency ranges. Follow the link to the AMSAT-UK web provided below for the details of the region affected by the restrictions.

Ofcom say the use of radio by Amateurs in the designated areas could cause interference to Games applications; it is also possible that higher power transmissions from outside these areas could cause interference. Consequently, to avoid the risk of interference to Games applications, Ofcom request that Amateurs do not operate within the frequency ranges identified in the areas defined in Annexes A and B, and that Amateurs ensure that any signals that could be received in these areas are negligible. This indicates that the specified frequency ranges should be avoided for a considerable distance outside the designated zones. Clearly a well equipped station on a good site 75 km from the edge of a zone could still put a signal into that area.

Full story on AMSAT-UK web at: http://www.uk.amsat.org/6574

[ANS thanks Trevor, M5AKA and AMSAT-UK for the above information]

Silent Key - Greg Butler, KI4OTG

AMSAT has received the sad news of the passing of satellite operator Greg Butler, KI4OTG of Memphis, Tennessee. Greg had a a heart attack on April 18 and did not survive it. He just turned 48 in February. He is survived by his 18 year old son

Rick Tillman, WA4NVM noted, "Greg was one of the truly nice guys,

always polite and there to help. It's been our great pleasure and privilege to know and work with him in the Memphis ham community. He will truly be missed. God bless your soul faithful servant,"

John Papay, K8YSE recalled, "Greg was one of the most courteous operators that I've known. He was active on the birds and enjoyed working new grids. Greg was a gentlemen. We will miss hearing his voice on the birds."

[ANS thanks Rick Tillman, WA4NVM and John Papay, K8YSE for the above information]

Satellite Shorts From All Over

+ It is time to submit nominations for the upcoming open seats on the AMSAT-NA Board of Directors. Three directors and two alternate directors have terms expiring this year. The director seats open for election are held by Tom Clark, K3IO; Lou McFadin, W5DID; and Gould Smith, WA4SXM. The alternate director seats open for election are held by Mark Hammond, N8MH and Patrick Stoddard, WD9EWK. The AMSAT front page news at http://www.amsat.org has the instructions to submit your nominations.

+ The 2012 AMSAT Annual Meeting and Symposium will be held at the Holiday Inn, Orlando (Florida) Airport on October 26-28, 2012. Watch for the Call for Papers and more details as they become available. If you are interested in a Monday Trip (October 29) to the Kennedy Space Center please contact Martha via email: martha at amsat.org. The trip will include a round trip bus from the hotel and entrance to the Space Center. The cost will be about $100. This is a wonderful experience for those that haven't been and for those that have been multiple times. We need to get an idea of how many will participate to select the correct bus.

+ If you worked KP4FD as members of the Puerto Rico Field Day Group celebrated the IARU "World Amateur Radio Day" on April 18 you can receive an electronic certificate by sending a request via WP3GW. The group will also provide confirmations will be via eQSL and LoTW.

+ The next Hudson Valley Satcom net date is Thursday, April 26 at 8:00 PM EDT (UTC -4) on the 146.970 MHz repeater, and also on the N2EYH-L Echolink node. More info: http://www.hvsatcom.org/ (via Stu, WA2BSS)

+ Technical papers are solicited for presentation at the 31st Annual ARRL and TAPR Digital Communications Conference on September 21-23, 2012 in Atlanta, Georgia. Please send papers to: Maty Weinberg, ARRL, 225 Main St., Newington, CT 06111 or via e-mail to: maty@arrl.org.

+ UniverseToday posted a collection of photos of the Shuttle Discovery final flight aboard NASA's 747 Shuttle Carrier Aircraft during its Washington DC overflight and delivery to the Smithsonian Udvar-Hazy Center in Chantilly, Virginia. See: http://www.universetoday.com/94660/discovery-does-dulles-dc/ Video of the event is posted at: http://tinyurl.com/April17-Discovery Photos and a video of Discovery's departure from the Kennedy Space Center in Florida are posted at: http://tinyurl.com/Florida-Discovery NASA Goddard Center photos of the flight over Washington DC are at:

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  http://www.flickr.com/groups/discoverygoddard/
  A time-lapse photo panorama of Discovery's take-off from Florida:
  http://spaceflightnow.com/shuttle/sts133/images/pano_full.jpg

+ See how the moon appears to the crew aboard the ISS:
  http://www.universetoday.com/wp-content/uploads/2012/04/moon-iss.jpg

+ Students at Drexel University need mentoring in setting up a ground
  station. If you can help please contact Nick Pugh, K5QXJ via e-mail
  at quadpugh@bellsouth.net and he will put you in touch with the pro-
  fessor leading the cubesat program.

+ Painstakingly assembled from over 150,000 digital photos taken
  over the course of eight months, this stunning time-lapse video
  of aurora-filled Arctic skies is the latest creation by photo/
  video artist Ole C. Salomonsen. Take a moment, turn up the sound,
  sit back and enjoy the show! Play this too much and the XYL is go-
  ing to wonder what you're up to in the shack:
  http://tinyurl.com/Celestial-Lights (universetoday.com)

[ANS thanks everyone for the above information]


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In addition to regular membership, AMSAT offers membership in the
President's Club. Members of the President's Club, as sustaining
donors to AMSAT Project Funds, will be eligible to receive addi-
tional benefits. Application forms are available from the AMSAT
Office.

Primary and secondary school students are eligible for membership
at one-half the standard yearly rate. Post-secondary school students
enrolled in at least half time status shall be eligible for the stu-
dent rate for a maximum of 6 post-secondary years in this status.
Contact Martha at the AMSAT Office for additional student membership
information. And with that please keep in mind how fast we are going
as the Earth orbits the sun at an average speed close to 30 km per
second. The Sun travels at a speed of 250 km per second, but it still
takes 230 million years for it to complete a single revolution of the
galaxy.


73,
This week's ANS Editor,
JoAnne Maenpaa, K9JKM
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